RTCA Special Committee 186, Working Group 3

ADS-B 1090ES MOPS Maintenance

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DO-260A Field Definitions Need Clarification for Implementation of the NPRM Requirements

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Honeywell is in the process of upgrading a transponder for full compliance with the NPRM requirements. A few parameters defined by DO-260A have descriptions that are not concrete enough to implement without clarification. This working paper will identify the parameters and paragraphs of interest, and recommend that WG-3 provide formal clarification through a Change 3 to DO-260A. We also request that the clarification be made public as soon as possible through posting to the NPRM docket.

The NPRM requires "An indication if the flight crew has selected to receive ATC services". DO-260A §2.2.3.2.7.2.4.4 entitled "Receiving ATC Services" states the following:

> The "Receiving ATC Services" Operational Mode Code is a one-bit subfield ("ME" bit 29, Message bit 61) of the OM Code subfield in Aircraft Operational Status Messages. The ADS-B Transmitting Subsystem shall set this OM Code to ONE when the ADS-B Transmitting Subsystem is Receiving ATC Services, as indicated by an update having been received via an appropriate interface on board the transmitting aircraft within the past 5 seconds. Otherwise, this OM Code shall be set to ZERO.

It is unclear what the intent is with regard to setting this bit. I have spoken with several industry contacts and gotten some very different interpretations. One interpretation is that any 4096 code other than VFR (1200) should set this bit. Considering that we are now required to transmit the 4096 code in a squitter, it seems that this bit would be redundant if that is the intent. A further complication of this intent is that the VFR code is not 1200 in some countries. Would the ADS-B transmitter need to know what VFR code was currently applicable? Another interpretation I have heard is that this is a mechanism for reducing com channel traffic by allowing a pilot to press a button to indicate to ATC that he has a request as opposed to saying so over the com. Admittedly, this is not a likely interpretation but it illustrates the point that this language could use some improvement.

DO-260A §2.2.3.2.6.1.4 entitled "IFR Capability Flag" Subfield in Airborne Velocity Messages - Subtype "1" states the following:

> The "IFR Capability Flag " subfield is a 1-bit ("ME" bit 10, Message bit 42) field that shall be used to indicate IFR capability by being encoded as specified in Table 2-24.

Table 2-24: "IFR Capability Flag" Encoding

Coding	Meaning
0	Transmitting aircraft has no capability for applications requiring ADS-B equipage Class "A1" or above
1	Transmitting aircraft has capability for applications requiring ADS-B equipage Class "A1" or above

If you look at table 2-3 in the front of the document, it would appear that you set this bit when you implement one or all of the following: Simultaneous Approaches, Separation Assurance and Sequencing, Flight Path Deconfliction Planning. This terminology is roughly equivalent to some of the applications being worked today in various working groups: Merging and Spacing, Sequencing and Merging, In Trail Procedures. Another possible interpretation is that we have TX/RX capability for all of the required message fields in Class A1 as well as the required transmit power and receiver sensitivity. Again, this paragraph could use some clarification to ensure consistent implementation.

The NPRM requires "An indication whether a cockpit display of traffic information (CDTI) is installed and operable". DO-260A §2.2.3.2.7.2.3.3 entitled ""CDTI Traffic Display Capability" CC Code Subfield in Aircraft Operational Status Messages" states:

> The CC Code for "CDTI Traffic Display Capability" in Aircraft Operational Status Messages (TYPE=31, Subtype=0 or 1) is a 1-bit field ("ME" bit 12, message bit 44) that shall be set to ONE (1) as specified in Table 2-63 if the transmitting aircraft has a Cockpit Display of Traffic Information (CDTI) installed and that display is currently operating in a mode capable of displaying nearby ADS-B traffic. Otherwise, this CC code shall be ZERO (0).

Table 2-63: CDTI Traffic Display Capability Encoding

CDTI Traffic Display Capability	**Meaning**
0	No capability for CDTI Traffic Display Capability
1	Transmitting Aircraft has CDTI Installed and Operating

It is unclear what operational use this field has as defined. Having an operational CDTI is not sufficient to communicate capability to perform an application. It seems likely that this bit was a precursor to the ASA Capability Level (ACL) as defined in DO-289. If the NPRM intends to use this field to communicate capability to perform an ASA Application, then the requirements of that application should be met before setting this field. Those application requirements should be included in the text of this requirement to ensure consistency across transmit implementations. Otherwise, it is our recommendation to mark this field reserved until MOPS Requirements are defined for ACL.